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10/726,357	12/03/2003	Andrew Jay Skoog	13DV-13672 (07783-0086)	8999
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EXAMINER				
TUROC, DAVID P				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/726,357

**Applicant(s)**

SKOOG ET AL.

**Examiner**

DAVID TUROCY

**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. The applicants amendments, filed 2/25/2008, have been fully considered and reviewed by the examiner. The examiner notes the amendment to independent claims 1 and 16. Claims 1-22 remain pending in the instant application.

### ***Response to Arguments***

2. Applicant's arguments filed 2/25/2008 have been fully considered but are directed to newly amended claims that were not present at the time of the prior rejection.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-22 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claim requires that the ceramic layer is applied by tape, however, the specification is completely silent in this regards. The specification can reasonably be interpreted to disclose air assisted spraying, however,

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the disclosure is completely silent to applying the ceramic layer by tape, as now presently claimed. Paragraph 0015 discloses various room-temperature techniques for application of the reflective coating include HVLP, brushing, decal transfer, however, none of these discloses techniques can reasonably be interpreted as application by tape as now currently claimed.

### **Claim Rejections - 35 USC § 103**

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-6, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and US Patent 6165600 by Ivkovich et al, hereafter Ivkovich.

Nagaraj et al. teaches a method of applying a heat reflecting on a nickel-based superalloy component of a gas turbine engine by applying a ceramic thermal barrier coating onto the substrate by plasma spraying and then applying the heat reflecting layer of gold or platinum on the thermal barrier coating (Col. 3, line 26-Col. 4, line 24). It is the examiners position that the ceramic thermal barrier coating dries prior to application of the heat reflective coating. Nagaraj et al. does not teach the claimed

method of applying the heat-reflecting layer. However, Nagaraj et al. teaches that the heat-reflecting layer can be applied by any conventional deposition technique (Col. 3, lines 49-57). Klabunde teaches forming a reflective metal layer, such as a gold or platinum layer, on a substrate by forming a dispersion of metal particles and organic solvent carrier, applying the dispersion to a substrate and then heating/firing to form the metal layer, where the dispersion can be applied by spraying (Col. 3, lines 35-65; Col. 6, lines 30-54).

Nagaraj et al. in view of Klabunde does not teach the spraying is an air assisted spraying technique. However, using air to atomize and project a spray for coating a gas turbine engines is well established in the art, as shown by Kirk-Othmer. (see page 672, Table 1, page 688, Table 2), and hence would have been an obvious method of spraying the heat-reflective coating because of the expectation of successfully forming the reflective layer.

It would have been obvious to one of ordinary skill at the time of the invention was made to apply the heat reflective layer of Nagaraj using conventional spraying as taught by Klabunde and specifically the conventional air-assisted spraying as disclosed by Kirk-Othmer because of the expectation of successfully applying the heat reflective layer on a gas turbine engine.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer do not teach the gas turbine engine having an outer ceramic layer applied by tape. However, Nagaraj et al teaches a gas turbine engine part, while preferably formed from a nickel-

based superalloy, can also be other suitable high temperature materials (Column 3, lines 29-31). Rigney et al teaching of a thermal barrier coating for a gas turbine engine discloses that deposition of a thermal barrier coating is advantageous to insulate a superalloy and/or ceramic substrate from high temperature. Additionally, Ivkovich discloses, at column 4, that application of a ceramic outerlayer by tape is known and suitable in the art of turbine engines.

Therefore, it would have been obvious to one skilled in the art at the time of the invention to Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer to use the ceramic substrate as suggested by Rigney et al to provide a desirable insulting coating because Rigney et al teaches both a superalloy and ceramic coating at known in the art to be subjected to high temperature environments. Additionally, it would have been obvious to apply an outerlayer of ceramic by tape because such is disclosed as known and suitable in the art and the selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich does not teach the claimed amount of reflective coating mixture and thermal barrier coating applied to the substrate. However, it is the examiners position that the amount of these coatings applied to the turbine component are known result effective variables, as not enough of these coatings applied to the component would not

provide the desired heat reflectance and thermal barrier properties, and too much would not offer additional benefits of increased heat reflectance and thermal properties.

Therefore, it would have been obvious to one skilled in the art at the time of the invention was made to determine an optimal coating amount for the heat reflective layer and the thermal barrier layer, in the process of Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al., through routine experimentation, to provide the desired heat reflecting and thermal barrier properties for the turbine component.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich as applied to claim 6 above, and further in view of Vakil.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich does not teach the claimed thermal barrier layer material containing lanthanum or cerium. Vakil teaches a nickel-based superalloy gas turbine engine component having a ceramic thermal barrier coating, where the coating can include cerium (Col. 6, lines 1-25).

It would have been obvious to one skilled in the art at the time the invention was made to use the ceramic thermal barrier coating material of Vakil, including the cerium component, in the process of Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich with the expectation of providing suitable

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thermal barrier properties, as shown by Vakil for nickel-based superalloy gas turbine engine components.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich as applied to claim 6 above, and further in view of Eppler.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich does not teach that the ceramic thermal barrier coating is applied by air assisted spraying. However, Eppler teaches breaking down a ceramic into fine particles and air assisted spraying them onto a substrate (Page 955, Column 3).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich to use the air assisted spray technique suggested by Eppler to provide a desirable ceramic coating on a substrate. Eppler teaches air-assisted spraying is known in the art to provide ceramic coatings onto a substrate.

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich as applied to claims 1 above, and further in view of Tecle.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich does not teach of providing a reflective-coating mixture with a noble metal encapsulator. Tecle teaches of a method for forming a palladium, silver, gold or platinum in an organic carrier (Column 3, lines 25-35). Tecle discloses utilizing an encapsulant material to limit the required amount of solvent (Column 4, lines 59-67). Tecle utilizes a metallic colloidal solution with fluxing agents to coat ceramics, metals, and ceramic/metal composites (Column 7, lines 10-31).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich to use a solution containing a metal encapsulant and fluxing agent as taught by Tecle to provide a desirable metallic coating because Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich teaches using a metallic pigment in an organic solvent for coating a surface and Tecle teaches a metal encapsulant reduces the large amount of solvent required when coating a ceramic or metal substrate and fluxing agents are provide enhanced adherence of a coating to a substrate.

10. Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich as applied to claims 1 above, and further in view of Akechi.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich does not teach a reflective coating mixture containing a glass or ceramic comprising up to 25 wt% of the reflective mixture. Akechi teaches of using glass frit and noble metal dispersion in an organic vehicle to form a coating (Abstract). Akechi discloses using 1-3 wt % glass frit and 37-59 wt % noble metal powder in a 40-60 wt % organic vehicle (abstract). The subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made if the overlapping portion of the range as disclosed by the reference were selected because overlapping ranges have been held to be prima facie case of obviousness. See In re Worthem 191 USPQ 90.

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich to use the glass frit/noble metal in an organic vehicle taught by Akechi to provide a desirable noble metal coating which experiences no deformation when coating.

11. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich as applied to claim 1 above, and further in view of Skoog et al.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich does not teach a firing temperature. Skoog et al. teaches of a gas

turbine engine with a metal or a ceramic diffuse reflective barrier coating fired at a temperature between 800°F to 2500°F and more typically 1650°F (Column 10, lines 65-68).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich to use the firing temperature suggested by Skoog et al. to provide a desirable firing of a reflective barrier coating because Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., and Ivkovich teach of firing the barrier coating on a gas turbine engine part and Skoog et al. teaches of firing a barrier coating on a gas turbine engine is typically completed at 1650°F.

12. Claims 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., Ivkovich, Eppler, Tecle, and Akechi as applied above, and further in view of Demaray.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., Ivkovich, Eppler, Tecle, and Akechi teaches all the limitations of these claims as discussed above, except pre-treating the component surface prior to coating. Demaray teaches pretreating a component prior to application of a thermal barrier layer, in order to achieve a desired surface roughness (Col. 2, line 49-Col. 3, line 5). One skilled in the art would have recognized that such polishing/roughening is conventionally used for enhancing the adhesion of subsequently applied coatings to a substrate.

Therefore, it would have been obvious to one skilled in the art to pretreat the nickel-based superalloy component of Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., Ilovich Eppler, Tecle, and Akechi, prior to applying the coatings, in order to enhance the bonding of the coatings to the metal components, since polishing of superalloys prior to coating to enhance coating adhesion is disclosed by Demaray.

### ***Conclusion***

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **DAVID TUROCY** whose telephone number is (571)272-

2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David Turocy/  
Examiner, Art Unit 1792

/Timothy H Meeks/  
Supervisory Patent Examiner, Art Unit 1792